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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/709,616	11/13/2000	David W. Warren	12.150	4083

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William W Haefliger
Suite 512
201 South Lake Avenue
Pasadena, CA 91101

EXAMINER

LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 01/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/709,616

Applicant(s)

WARREN ET AL.

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment submitted on September 29, 2005 has been received and carefully considered. Claims 6 and 13-15 are cancelled. Claims 1-5 and 7-12 remain active.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 2 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steiner et al. (US 4,134,908) in view of Dorschner et al. (US 2,662,911).

Regarding claim 1, Steiner et al. (FIG. 9; column 4, line 67 to column 5, line 21) discloses an apparatus for the producing methane from carbon dioxide and hydrogen, said apparatus comprising, in combination,

a centrally located waste-heat recovery steam generator for recovery of exothermic reaction heat to generate steam (i.e., comprising a central cooling tube **500**, for generating steam from cooling water supplied by water header **508**);

an outer region (i.e., defined by the annular space, between outer tube **502** and cooling tube **500**) extending at least part way about said waste-heat recovery steam generator **500** and in heat transfer communication with the steam generator **500**; and

a catalyst (i.e., a nickel methanation catalyst; column 5, lines 53-63) located within said outer region, all of said catalyst extending only helically and about the steam generator **500**; there being flow guide surfaces (i.e., as defined by the turbulator strip or ribbon **504**) extending helically adjacent the catalyst (i.e., in the case of "the nickel catalyst plated or coated by

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deposition” on the surface of a turbulator made of dissimilar metal) to direct all gases to flow only helically (i.e., “In passing through the annular space within the methanation tubes the feed gas follows a spiral path along the surface of the catalytic strip or ribbon **504**,” column 5, lines 15-17), the bed located entirely outside and proximate to the steam generator **500**, the bed being continuous in the helical direction of guided flow about the steam generator **500**; (see FIG. 9).

Because the particular composition of catalyst is not instantly recited in the claim, and the operation of a water-gas shift reaction for producing the exothermic reaction heat is recited as intended use, the apparatus of Steiner et al., despite having a methanation catalyst for conducting a methanation reaction, meets the claim.

In view of the newly added limitations, Steiner is silent as to said catalyst comprising a packed catalyst which fills the volume between the inner and outer wall surfaces of the outer region. In contrast, the catalyst of Steiner is plated or coated onto the helical coil **504**.

In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute another known form of catalyst, e.g., a packed catalyst, for the plated or coated catalyst in the apparatus of Steiner et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because the substitution of known equivalent structures involves only ordinary skill in the art, *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958), and the use of a methanation catalyst in packed form is conventionally known in the art, as evidenced by Dorschner et al. In particular, Dorschner et al. (FIG. 13-17; column 16, line 56 to column 17, line 52) teaches a similar apparatus that is suitable for conducting the hydrogenation of carbon monoxide, wherein the

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catalyst is a packed catalyst, filled into tubes **42** which may comprise a helical coil (i.e., screw shaped windings or insertions **48**; FIG. 13) as well as a centrally located steam generator (i.e., inner tube **58**, connected to the cooling medium space; FIG. 14).

Regarding claim 2, the apparatus of Steiner et al. structurally meets the claim because the temperature at which the waste heat steam generator **500** operates is not considered an element of the apparatus but a process limitation that has not been given any patentable weight.

Regarding claims 7, 9 and 10, Steiner et al. discloses an inner wall (i.e., as defined by the outer surface of cooling tube **500**) and an outer wall (i.e., defined by the inner surface of outer tube **502**) for defining an annular space containing the helical bed **504**, wherein the flow guide surfaces comprise a helical coil (i.e., a helically shaped ribbon or coil). Also, the helical length of the bed is selected to define a gas hourly space velocity within the instantly recited range (i.e., “Typically, the gas space velocity will range from 1800 to as high as 8000 v/v/hr,” column 3, lines 45-47). Steiner et al., however, is silent as to the annular space being between 1 and 2 inches wide. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate width for the annular space in the apparatus of Steiner et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because it has been held that changes in size involve only ordinary skill in the art, and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Rose*, 220 F.2d 459, 463, 105 USPQ 237, 240 (CCPA 1955), *In re Aller*, 105 USPQ 233.

Regarding claim 8, catalyst bed **504** is located adjacent to the steam generator **500** (see FIG. 9) and therefore, the catalyst bed is, inherently, sufficiently close to said generator **500** for

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the generator to maintain temperature control of the bed. Although Steiner et al. is silent as to the catalyst bed being maintained within the recited temperature ranges, the apparatus of Steiner et al. structurally meets the claim because the temperature of the catalyst bed is not considered an element of the apparatus but a process limitation that has not been given any patentable weight.

3. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steiner et al. (US 4,134,908) in view of Dorschner et al. (US 2,662,911), as applied to claim 1 above, and further in view of Muenger (US 3,666,682).

The collective teaching of Steiner et al. and Dorschner et al. is silent as to said catalyst comprising a Cu/Zn catalyst for conducting the water-gas shift reaction. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute another type of catalyst, such as a Cu/Zn catalyst, for the methanation catalyst in the modified apparatus of Steiner et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because the examiner takes Official Notice that it is well known in the art to substitute a different type of catalyst in a reactor in order to catalyze a different chemical reaction. It is further well known in the art that the water-gas shift reaction is exothermic and, similarly, requires active heat removal and temperature control in order to attain the desired CO conversion, as evidenced by Muenger (column 1, lines 10-30). In particular, Muenger teaches an apparatus comprising a water-gas shift catalyst **5** (i.e., which may be a conventional, low temperature shift catalyst comprising copper and zinc oxide; column 3, lines 61-75) that is in thermal communication with a steam generator, as defined by heat exchangers **3** and **4**, in order to control the temperature of the catalyst bed (column 5, lines 10-23; column 6, lines 8-23).

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4. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as obvious over Steiner et al. (US 4,134,908) in view of Dorschner et al. (US 2,662,911), as applied to claim 1 above, and further in view of Collins et al. (US 5,458,857).

Steiner et al. further discloses the steam generator including an upright vessel (i.e., a steam drum 506), and said outer region having an upper level inlet 514 and a lower level outlet 518 (see FIG. 9). Steiner et al. is silent as to the waste heat steam generator comprising one or more heat transfer conduits that transfer heat from combustion products to the water for generating steam. Collins et al. (FIG. 3, 7; column 11, lines 29-46) teaches a waste heat steam generator 416 comprising one or more heat transfer conduits (i.e., start up tubes 417) for transferring heat from combustion products to the water for generating steam. It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide one or more heat transfer conduits to the apparatus of Steiner et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, because the heat transfer conduits allows the reactor to be rapidly brought up to the required operation temperature, as taught by Collins et al.

Response to Arguments

5. Applicant's arguments with respect to claims 1-5 and 7-12 have been considered but are moot in view of the new ground(s) of rejection, necessitated by amendment.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

As set forth in 37 CFR 1.136(a), a shortened statutory period for reply to this final action

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
is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

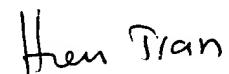
* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung
January 6, 2006 


HIEN TRAN
PRIMARY EXAMINER